

**Spring Creek Bladderpod
(*Paysonia perforata*)**

**Status Review:
Summary and Evaluation**



Photo credit U.S. Fish and Wildlife Service

Spring Creek Bladderpod in bloom.
Photo Credit: U.S. Fish and Wildlife Service.

**U.S. Fish and Wildlife Service
Southeast Region
Tennessee Ecological Services Field Office
Cookeville, TN**

June 2024

STATUS REVIEW
Spring Creek Bladderpod (*Paysonia perforata*)

GENERAL INFORMATION

Current Classification: Endangered

Lead Field Office: Tennessee Ecological Services Field Office (TNFO), Cookeville, TN

Review Author: Kerri Dikun, TNFO, Kerri_Dikun@fws.gov, 931-525-4991

Reviewers:

Lead Regional Office: Atlanta Regional Office, Carrie Straight, (404) 679-7226

Date of original listing: December 23, 1996 (61 FR 67493)

Methodology used to complete the review:

In accordance with section 4(c)(2) of the Endangered Species Act of 1973, as amended (Act), the purpose of a status review is to assess each threatened species or endangered species to determine whether its status has changed and if it should be classified differently or removed from the Lists of Threatened and Endangered Wildlife and Plants (50 CFR 424.11). The U.S. Fish and Wildlife Service (Service) evaluated the biology, habitat, and threats of the pygmy madtom to inform this status review.

We announced initiation of this review in the Federal Register on May 11, 2023 (88 FR 30324) with a 60-day comment period. We did not receive any public responses to the Federal Register notice. We received updates from conservation partners regarding the species in response to an information request sent to them concurrent with the public notice. The primary sources of information used in this analysis were the Spring Creek bladderpod final listing rule (61 FR 67493), the Recovery Plan for Spring Creek Bladderpod (Service 2006), peer-reviewed literature, and unpublished survey data and reports. This review was completed by the U.S. Fish and Wildlife Service, Tennessee Ecological Services Field Office (TNFO), Cookeville, TN. All literature and documents used for this review are on file at the TNFO. All recommendations resulting from this review are the result of thoroughly reviewing the best available information on the Spring Creek bladderpod.

We have not received significant new information, interpreted previously reviewed information in a new, significant light since the last review of the species and the level of public interest is low and non-controversial; therefore, no peer review was conducted.

FR Notice citation announcing the species is under active review:

May 11, 2023 (88 FR 30324)

Species' Recovery Priority Number at start of 5-year review ([48 FR 43098](#)):

5 (high degree of threat, low recovery potential)

Review History:

Previous 5-year reviews recommending no change in status were published on October 19, 2011 and September 23, 2019.

REVIEW ANALYSIS

Taxonomy and nomenclature

We are not aware of any changes to the taxonomy of this entity, and it is still considered valid by the Service. The nomenclature is consistent with and follows that listed in the Integrated Taxonomic Information System (2024).

Recovery Criteria

Recovery Plan or Outline

Recovery Plan for (*Lesquerella perforata*) Spring Creek bladderpod, August 24, 2006

Recovery plans are not regulatory documents and intended to provide guidance to the Service, States, and other partners on methods of minimizing threats to listed species and on criteria that may be used to determine when recovery is achieved. If the recovery criteria defined in the plan are still valid, meeting recovery criteria can indicate that the species no longer requires protections under the Act. However, when recommending whether a listed species should be delisted, the Service must apply the factors in section 4(a) of the Act ([84 FR 45020](#)).

Spring Creek bladderpod will be considered for delisting when there are 25 protected occurrences, with at minimum five occurrences located within the floodplain of each of the three creeks (Spring Creek, Barton's Creek, and Cedar Creek). Each occurrence located on either public or private land must be protected by a permanent conservation easement with a management agreement. Each occurrence must consist of an average of 500 plants over a ten-year period, with no less than 100 plants in any given year.

Criteria for reclassification have not yet been met.

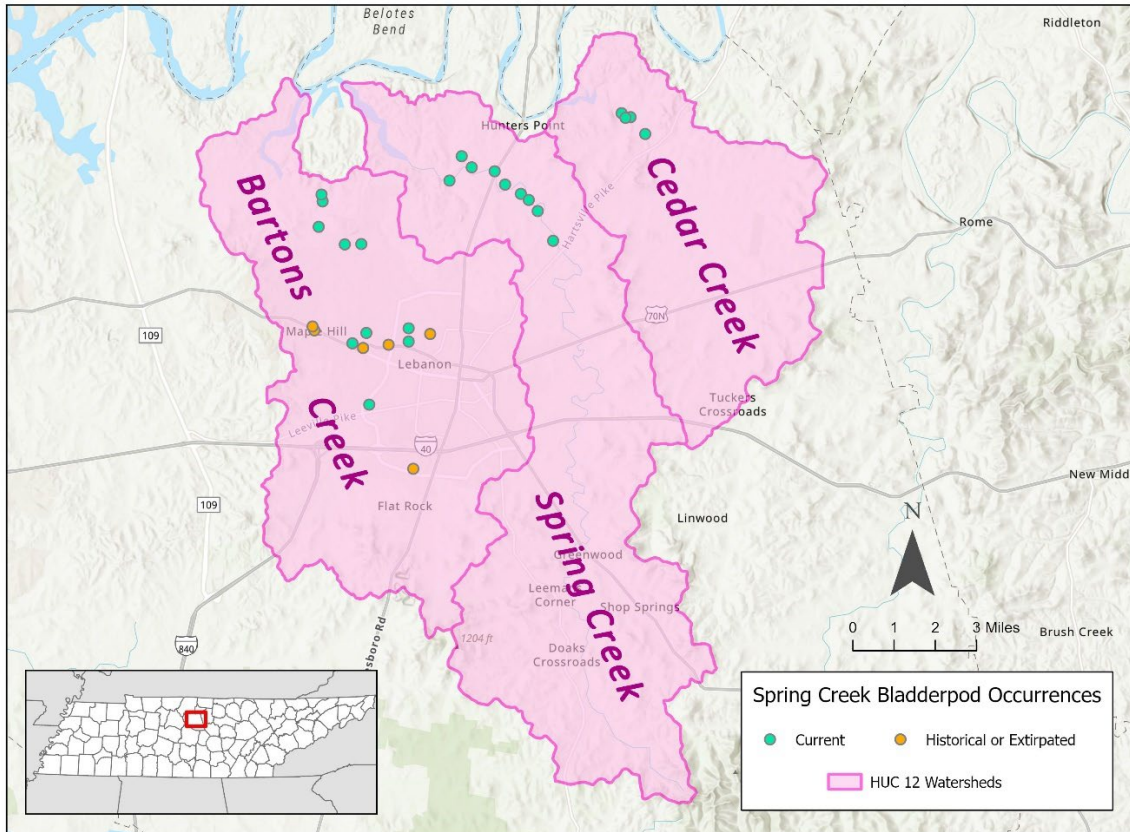
Biology and Habitat Summary

For this review we use Element Occurrences (EOs) as the primary unit of our evaluation. An EO is defined as "an area of land and/or water in which a species or natural community is, or was, present" (NatureServe 2020) and the EOs in this review were designated using the NatureServe Natural Heritage methodology (NatureServe 2020). The Tennessee Department of Environment

and Conservation (TDEC) monitors EOs and maintains related data. We used these data to inform this review.

Range and Distribution

The range of Spring Creek bladderpod remains limited to three adjacent HUC 12 watersheds in Wilson County, Tennessee: Spring Creek, Barton’s Creek, and Cedar Creek (Figure 1).



Esri, TomTom, Garmin, FAO, NOAA, USGS, EPA, USFWS, Esri, NASA, NGA, USGS, Esri, TomTom, Garmin, SafeGraph, METI/NASA, USGS, EPA, NPS, USDA, USFWS

Figure 1. Current and historical Spring Creek Bladderpod element occurrences across three occupied HUC 12 watersheds: Barton’s Creek, Spring Creek, and Cedar Creek

Currently there are 23 element occurrences of Spring Creek bladderpod that are considered extant in TDEC’s natural heritage database (TDEC 2024) and the species’ distribution within its restricted range has changed little since the 2019 review (Table 1). Since the last review, the number of Spring Creek bladderpod element occurrences remained the same in the Cedar Creek watershed; one additional element occurrence (EO 37) was discovered in 2023 in the Spring Creek watershed; and in the Barton’s Creek Watershed, EO 25 was re-classified as extirpated due to the construction of a building where the species had previously been located.

Table 1. Current (2024) and past numbers of Spring Creek bladderpod occurrences, listed by HU12 watersheds where the species is found.

HUC12 Watershed	2006	2011	2019	2024
Spring Creek	6	7	8	9
Barton's Creek	11	11	11	10
Cedar Creek	4	4	4	4
Total	21	22	23	23

Abundance

The abundance of Spring Creek bladderpod at EOs surveyed within the last five years is presented below (Table 2).

Table 2. Abundance of Spring Creek bladderpod (true counts, estimates, and ranges) at EOs surveyed between 2020 and 2024 (TDEC 2023; Elam 2024, pers. comm.; French 2024, pers. comm.).

Watershed	EO Number	2020	2021	2022	2023	2024
Barton's Creek	4	26*	5*	0		0
Barton's Creek	6	5000-10,000	1216*	~1167	509*	12*
Barton's Creek	10	1100-2200	486*	123+		
Barton's Creek	11a	2200-3200	1752*	2100-3200	5100-10,300	1604*
Barton's Creek	11c	0		1000-2000	~500	0
Barton's Creek	17	0				
Barton's Creek	20	112*				
Barton's Creek	21	36*	17*	0	24*	1*
Barton's Creek	34	6*				
Cedar Creek	29	4957*	132*	399*	400*	1000-2000
Cedar Creek	30	400+	8*		689*	
Cedar Creek	31	1200*	213*			
Spring Creek	3	10,000+	2000-5000		5000-10,000	
Spring Creek	13	333*	0	9*		
Spring Creek	14	10000+	2000-5,000	5000-10,000	5000+	2000-5000
Spring Creek	15	1000-2000	2000-5,000	200-500		2000-5000
Spring Creek	32	2100-3100	1200*	1000-2000		<100
Spring Creek	35	938*	373*	90*	196*	0
Spring Creek	37				1215*	2388*

*Indicates a true count; + and ~ indicate estimates.

The monitoring approach currently used for Spring Creek bladderpod, i.e., counting or visually estimating numbers of individuals, does not permit statistical evaluation of trends over time, but available data indicate that abundance at a given site varies considerably over time. The species' annual life cycle, dependence on appropriately timed disturbances for maintaining suitable habitat conditions for both germination and growth, and environmental variability likely contribute to the extreme fluctuations observed over time. Despite difficulties in distinguishing statistically significant trends, and/or conclusively attributing changes in abundance directly to

habitat or management, we discuss EOs that have exhibited decreases or low abundance since the last review:

- EO 6: A portion of this EO was extirpated due to development in 2022, resulting in a decrease in abundance. Topsoil was collected from this site and transferred to a property owned by the City of Lebanon. Although plants germinated the following year at the translocation, the overall abundance of this EO has sharply decreased.
- EO 13: This EO exhibited a decrease from 333 plants in 2020, to 0 and 9 plants in 2022 and 2023, respectively. The cause of this decline is not certain, however this location is noted as being overgrown with fescue and blackberry, which may indicate habitat degradation is contributing to this decline.
- EOs 4, 10, 11c, 21, 32, and 35 have exhibited declines and/or consistently low numbers since the last status review. The cause of declines and/or low abundances at these EOs are unknown.

Consistently low abundance and/or large decreases in abundance could lower resiliency and may make populations more prone to extirpation. Further investigation would be needed to evaluate if low abundance or decreases are due to natural fluctuations or are due to habitat degradation or incompatible management (e.g. no-till agriculture, herbicide use, disking or mowing at incompatible times, etc.) and/or if abundance could be improved with compatible management.

Status of Element Occurrences

Although the overall number of extant EOs remains the same since the last status review, we note that there are five EOs we consider at risk for extirpation as the species has not been observed in over ten years, and one that is at risk of extirpation due to planned development at the site (Table 3):

Table 3. The years at-risk EOs were last surveyed, and the years Spring Creek Bladderpod was last observed.

Watershed	EO Number	Last Surveyed	Last Year Species Observed	Details
Barton’s Creek	10	2024	2023	Development of this property is expected
Barton’s Creek	17	2020	2011	Species not observed in the last 13 years
Barton’s Creek	18	2009	2009	Species not observed in the last 15 years
Barton’s Creek	19	2019	2011	Species not observed in the last 13 years
Cedar Creek	28	2019	2013	Species not observed in the last 11 years
Spring Creek	24	1999	1997	Species not observed in the last 27 years

The life history of this annual species, which is dependent on maintaining soil seed banks (Fitch *et al.* 2007), allows for long periods of dormancy when habitat conditions are not appropriate for germination. Breaks in dormancy have been recorded after periods spanning more than five years, following a return to compatible land management practices (TDEC 2023). Although the species has not been observed recently at the EOs listed above, it is possible a seed bank still exists.

Additional investigation would be needed to evaluate that both suitable habitat and/or the species persist at these EOs. If habitat and a seedbank persist, appropriate management would likely be needed to promote growth. If loss of these EOs is confirmed, this would confer lower redundancy of the species.

Management

Conservation efforts are being implemented, but do not yet demonstrate effectiveness in abating threats to the species. At the time of the last status review there were two formal management agreements for the species which have since expired. Currently there are no formal management agreements in place. Additionally, most EOs occur on private land and targeted management for the Spring Creek bladderpod is limited. Below we discuss Spring Creek bladderpod management efforts that have occurred since the last status review.

- The City of Lebanon managed, or worked with landowners to manage, four EOs since the last status review. Management consisted of light disking to help promote conditions for germination. Additionally, the City of Lebanon transferred topsoil from EO 6 to a city-owned property to preserve a portion of the population impacted directly by development. The species successfully germinated at the transfer site in spring 2023 and again in 2024, however, there were low numbers of plants in 2024. Continued monitoring would be needed to determine the long-term success of these transferred plants.
- The Southeastern Grasslands Institute (SGI) is working with the landowner at the recently discovered occurrence in the Spring Creek watershed (EO 37). SGI conducted a late summer burn in 2023 and installed artificial bison wallows (topographical depressions in prairie habitat created by people to mimic conditions that would have naturally been created by bison) to encourage germination. Spring Creek bladderpod successfully flowered in 2024 in both the burned and unburned areas of the site. More study would be needed to determine the species' response to fire and/or to determine long-term trends. SGI intends to continue to investigate properly timed fire (i.e., after the plant sets seed and prior to germination) and artificial bison wallows as management tools for this species at this site.

Threats (Five-Factor Analysis) Summary

The Spring Creek bladderpod was listed as an endangered species in 1996 due to habitat degradation or destruction from development and from vegetative encroachment (Factor A), and insufficient legal protections (Factor D) (61 FR 67493).

The status of a species is determined from an assessment of factors specified in section 4(a)(1) of the Act, including: Factor A: the present or threatened destruction, modification, or curtailment of its habitat or range; Factor B: overutilization for commercial, recreational, scientific, or educational purposes; Factor C: disease or predation; Factor D: the inadequacy of existing regulatory mechanisms; Factor E: other natural or manmade factors affecting its continued existence. A summary of this assessment is detailed below.

- Present or threatened destruction, modification or curtailment of the habitat or range (Factor A) for Spring Creek bladderpod remains a threat to the species. The high number

of Spring Creek bladderpod occurrences on private property, in combination with the increases of development within the range of the species, presents a high degree of threat for the species. Furthermore, the species requires consistent disturbance to maintain conditions for germination, to prevent vegetation encroachment, and for healthy populations to persist. At many EOs, disturbance comes from human activities, such as plowing or disking, but disturbances occurring during flowering (early spring) or after germination (late summer to early fall) can be detrimental. This leaves just a small window each year for management, and the timing may not coincide with the needs of farmers or other landowners. Furthermore, other common management used by landowners, such as certain herbicide applications (e.g. broad application of pre-emergent herbicides, or poorly-timed application of post-emergent herbicides), can also be detrimental to the species. The conflicting needs of landowners and the needs of the species also contribute to the high degree of threat and low recovery potential for the species.

Since the last status review, the human population of Wilson County has increased. The 2023 population estimate for Wilson County showed a 10.8% increase since 2020 (U.S. Census Bureau 2024). Likewise, between 2016 and 2021, the amount of land classified as developed (all categories) increased by 2.4 % across all three watersheds (U.S. Geological Survey 2024). Direct impacts of development were observed at EO25 where suitable habitat was lost to construction of a building and at EO6 where most of the population was lost to development. Additionally, habitat degradation from vegetation encroachment is suspected at EO 13. Due to these increases in human development and observations of habitat loss and degradation since the last status review, Factor A remains a threat to the species.

- Overutilization for commercial, recreational, scientific, or educational purposes (Factor B) and disease and predation (Factor C) were not considered issues at the time of listing. We have no evidence to suggest that these factors contributed to the decline of this species or are preventing species recovery.
- Protections afforded to the Spring Creek bladderpod through regulatory mechanisms (Factor D) continue to be inadequate to protect from population declines and degradation of habitat. The Tennessee Rare Plant Protection and Conservation Act of 1985 (T.C.A. 11-26-201) regulates the sale or export of endangered species via a licensing system and this statute prohibits persons from knowingly uprooting, digging, taking, removing, damaging, destroying, possessing, or otherwise disturbing for any purpose, any endangered species from private or public lands without the written permission of the landowner, lessee, or other person entitled to possession and prescribes penalties for violations. These regulations do not prevent the destruction or development of the species or the habitats on private lands, and are not to interfere with, delay, or impede any public works project. The lack of adequate regulatory protections, particularly on private lands, contributes to the low recovery potential of the species. Overcoming the lack of regulatory mechanisms to protect Spring Creek bladderpod would likely require voluntary measures, such as establishing conservation easements, that could provide protections lacking in current regulations. Land acquisition by city, state, or federal entities could also play an important role in protecting the species.
- We have not identified any additional natural or manmade factors affecting the Spring Creek bladderpod since the previous review for the species. As discussed in the prior

status review (Service 2019), climate change may present a threat to the species (Glick *et al.* 2015, Watson *et al.* 2014). We have no new information that this threat has changed since the last status review. Additionally, the species' limited range and small number of populations may exacerbate the species' vulnerability to other threats due to the limited geographic range, limited variation in environmental conditions among sites and, presumably, reducing adaptive variation among populations of the species.

Synthesis

The Spring Creek bladderpod is an annual plant endemic to Tennessee. The species currently occurs in only three HUC 12 watersheds in Wilson County, TN: Spring Creek, Barton's Creek, and Cedar Creek. Since the last status review, one additional occurrence of the species was discovered in the Spring Creek watershed, and one occurrence was designated as extirpated in the Barton's Creek watershed, resulting in a total of 23 extant populations across the range. The species primarily occurs on private land, with no management agreements currently in place. The species has shown some response to management efforts at the few EOs where targeted management has been implemented, however only a few EOs receive targeted management and long-term responses are unknown. Increases in human populations and development continue to drive habitat degradation (Factor A) throughout the species' range. Regulatory mechanisms (Factor D) are insufficient to protect the species from these threats. Due to its limited distribution, continued threats, and lack of adequate protections, the Spring Creek Bladderpod continues to be in danger of extinction throughout its range. Therefore, the status of the species as endangered remains appropriate. The recovery priority number for the Spring Creek bladderpod should remain 5, as the degree of threat remains high and the potential for recovery is low.

RECOMMENDED FUTURE ACTIVITIES

A detailed discussion of recovery actions and criteria are presented in the Spring Creek Bladderpod Recovery Plan (Service 2006). Renewing recently expired conservation agreements and/or identifying landowners with which to develop new management agreements would be supportive of recovery criteria and recovery actions identified in the recovery plan. The priority 1 actions identified in the recovery plan (e.g. establishing protection goals for EOs, pursuing easement or conservation agreements with landowners, developing management plans for EOs, etc.) are still very relevant. Actively engaging partners, and exploring opportunities for new partnerships, to implement these actions could be helpful in reinvigorating conservation efforts. Implementing these actions may also be facilitated by working proactively with landowners to balance the needs of the species within a sustainable working landscape and/or in the context of increased development pressures.

RESULTS / SIGNATURES

**U.S. Fish and Wildlife Service
Status Review of Spring Creek Bladderpod (*Paysonia perforata*)**

Status Recommendation:

On the basis of this review, we recommend the following status for this species. A 5-year review presents a recommendation of the species status. Any change to the status requires a separate rulemaking process that includes public review and comment, as defined in the Act.

Downlist to Threatened

Uplist to Endangered

Delist:

The species is extinct

The species does not meet the definition of an endangered or threatened species

The listed entity does not meet the statutory definition of a species

No change needed

FIELD OFFICE APPROVAL:

Field Supervisor, Tennessee Ecological Services Field Office, Fish and Wildlife Service

Approve _____

REFERENCES

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